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AN EMERGENCY WARNING SIGNALLING METHOD  
WHEN INCREASING FRICTION IN THE BEARINGS  
OF A SHIP'S SHAFT

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17 November 1972

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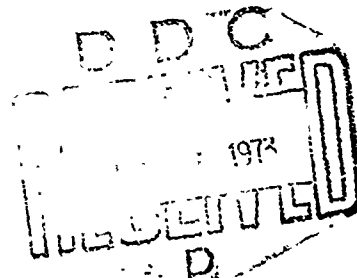
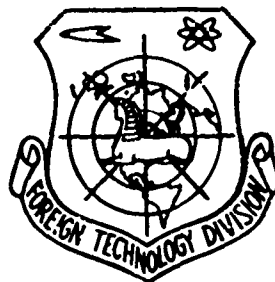
## FOREIGN TECHNOLOGY DIVISION



AN EMERGENCY WARNING SIGNALLING METHOD WHEN INCREASING  
FRICTION IN THE BEARINGS OF A SHIP'S SHAFT

by

V. T. Guzeyev



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13. ABSTRACT  This method indicating greasing conditions and loss of oil film in ship shaft bearings is based on measuring changes of electric resistance across the oil film in the bearings. A ship's hull and a propeller made of different materials and submerged in sea water create an electric pare and a potential difference can be measured between the hull and a main shaft. A voltage difference depends on the oil film condition in the bearings and it varies from 300-370 mV when a good greening film is present to 40-180 mV and down to zero when the film is destroyed and any of the bearings dry. AA2006993			

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INCREASING FRICTION IN THE BEARINGS OF A SHIP'S  
SHAFT

By: V. T. Guzeyev

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# AN EMERGENCY WARNING SIGNALLING METHOD WHEN INCREASING FRICTION IN THE BEARINGS OF A SHIP'S SHAFT

V. T. Guzeyev

Methods are known of emergency warning signalling by means of periodically checking the heat of the external surfaces of bearings; these methods are based on a change of the electrical capacitance of the oil film of an insulated shaft. However, such a method of emergency warning signalling does not permit monitoring the entry of cooling water into the bearings or the leakage of oil out of the bearings.

The proposed method consists of the following: the change of electrical resistance of the oil film in the electrogalvanic circuit of the propeller-hull pair is used as an indicator of the increase in friction. In this manner the leakage of oil from the bearing below the lowest permissible level is determined on time.

The drawing shows the schematic diagram of current flow along the propeller-ship's shaft-bearing-ship's hull circuit. Because the propeller and steel sheathing of the hull are made of different metals, they have differing electrical potentials. A difference of potential - the electrical voltage - develops between the propeller and hull upon the presence of this electrochemical pair in water, which is an electrolyte.

Under normal operating conditions of this moving system, the electrical circuit of this source is disrupted by a film of oil in the ship's shafting. The electrical resistance between the supporting collars of the shafting and the surface of the bearing is high. As measured by a voltmeter, the voltage between the rotating shafting and the hull of the ship constitutes a significant magnitude (300 to 370 mV).

During a disruption of the oily film, for example, during the transition to semidry friction in any bearing of the shafting connected with the propeller, the resistance is sharply decreased. The electrical circuit of the propeller-shaft-motor-bearing-hull is completed, in which a current (up to 20 A) begins to flow, and the voltage between the shaft and the hull instantaneously drops, depending on the level of the disruption of the oily film in the bearing up to zero or to smaller values (40-180 mV).

With a nonoperating power plant, the voltage between the shafting and the hull is also equal to zero, and during operation (even with very small movement), the voltage approaches the rated (270-300 mV).

#### Subject of the Invention

The method of emergency-warning signalling, when there is an increase in friction in the bearings of a ship's shafting, which has an electrogalvanic circuit closed at the hull, *is distinguished* in that with the purpose of determining oil leakage in a timely manner from the bearing below the permissible limit, the change of electrical resistance of the oil film in the electrogalvanic circuit of the propeller-hull pair is used as the signal indicating an increase of friction.

